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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,905	08/26/2003	Jay S. Burnham	BUR920020109US1	1904
30449	7590	10/31/2006	EXAMINER	
SCHMEISER, OLSEN & WATTS 22 CENTURY HILL DRIVE SUITE 302 LATHAM, NY 12110			TOBERGTE, NICHOLAS J	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/604,905

Applicant(s)

BURNHAM ET AL.

Examiner

Nicholas J. Tobergte

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4,6-15 and 31-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,6-15 and 31-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Appeal Brief*

In view of the appeal brief filed on 8/22/06, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:



MATTHEW SMITH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

### *Response to Arguments*

Applicant's arguments with respect to claims 1, 4, 6-15, and 31-38 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 35-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 35 recites the limitation "said nitrogen, inert gas and reducing gas plasma" in Claim 35 (previous step). There is insufficient antecedent basis for this limitation in the claim. Claim 35 states "generating a nitrogen and inert gas plasma". It does not state generating a "nitrogen, inert gas and reducing gas plasma".

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 6, 7, 31-34 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Noble et al (US 6,450,116).

Pertaining to claims 1 and 31, Noble teaches a method of fabricating a gate dielectric layer, comprising:

forming a silicon dioxide layer on a top surface of a substrate **Col 3 line 64**;

placing said substrate **100** in a first chamber **200** having a first inlet port **275** and a second inlet port (**See Figure 3A wherein the second inlet port is shown as being left of item 317 where it states "TO PROCESS CHAMBER"**);

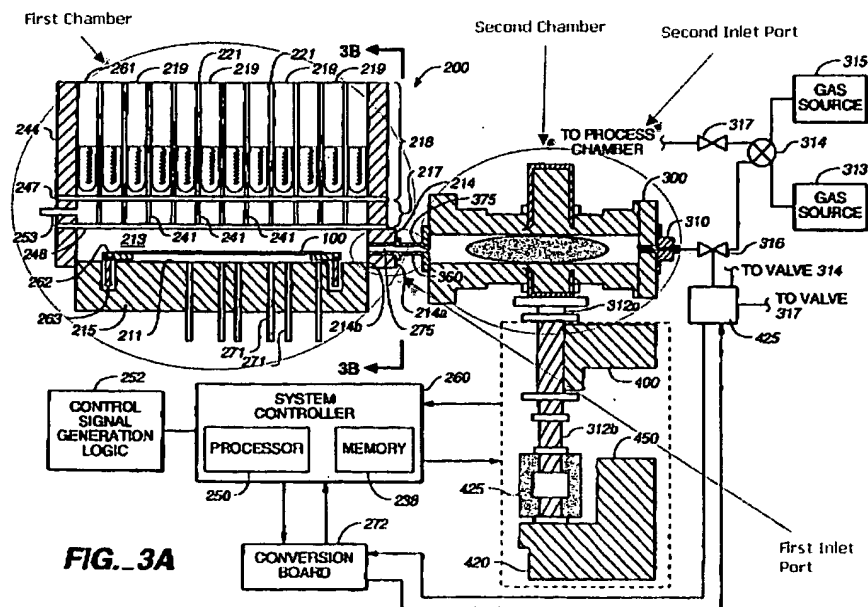
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generating a plasma in a second chamber 300, said plasma comprising at least one nitridation species **Col 4 line 21**, said second chamber adjacent said first chamber **See Figure 3A**, said second chamber connected to said first chamber by said first inlet port 275 in said first chamber;

transferring said nitridation species of said plasma from said second chamber to said first chamber through said first inlet port **Col 3 lines 66-67** (in regards to claim 31, this is "exhausting"); and

performing a plasma nitridation in said first chamber using said nitridation species in a reducing atmosphere to convert said silicon dioxide layer into a silicon oxynitride layer **Col 4 line 9**.

The following is Figure 3A with the key components labeled.



Pertaining to claim 32, Noble teaches the method of claim 1, further including:

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generating a nitrogen, inert gas and reducing gas plasma in said second chamber from nitrogen, an inert gas and a reducing gas; and

transferring said nitrogen, inert gas and reducing gas plasma from said chamber into said first chamber through said first inlet port of said first chamber. **Col 15 line 60 to Col 16 line 62**

Pertaining to claim 4, Noble teaches the method of claim 32, wherein said inert gas is helium **Col 3 line 57** and said reducing gas is hydrogen, ammonia, a mixture of hydrogen and nitrogen, a mixture of ammonia and nitrogen or a mixture of hydrogen, ammonia and nitrogen. **Col 16 lines 2-9**

Pertaining to claim 33, Noble teaches the method of claim 32, wherein said inert gas is helium **Col 3 line 57** and said reducing gas is deuterium, deuterated ammonia, a mixture of deuterium and nitrogen, a mixture of deuterated ammonia and nitrogen, a mixture of deuterium, deuterated ammonia and nitrogen, or a mixture of deuterium, ammonia and nitrogen. **Col 16 lines 2-9**

Pertaining to claim 34, Noble teaches the method of claim 32, wherein said inert gas is helium and said reducing gas is hydrogen. **See rejection of claim 4**

Pertaining to claim 38, Noble teaches the method of claim 1, wherein said nitridation plasma is generated by radio frequency excitation. **Col 12 lines 4-47**

Pertaining to claim 6, Noble teaches a method of fabricating a gate dielectric layer comprising;

providing a substrate;

forming a silicon dioxide layer on a top surface of said substrate;

performing a plasma nitridation in a reducing atmosphere to convert said silicon dioxide layer into a silicon oxynitride layer;

wherein the step of performing a plasma nitridation is performed using plasma comprising nitrogen, an inert gas and a reducing gas, and

wherein said inert gas is helium and said reducing gas is hydrogen.

**See rejection of claim 1 and claim 34.**

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noble as applied to the claims above.

Noble teaches the methods above, but fails to particularly point out all the parameters involved, However, given the teaching of the references, it would have been obvious to

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determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller*, Lacey and Hall (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation."

Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).



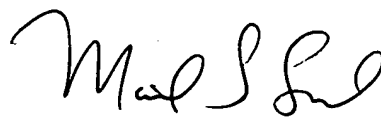
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas J. Tobergte whose telephone number is 571-272-6006. The examiner can normally be reached on Mon - Thur 7am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NJT



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